

REMARKS

Claims 1-3 are pending in the application.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawa et al., (Sawa) US PAT 6,351,397 in view of Sakai et al., (Sakai) US PAT 6,556,464.

The Applicants traverse the rejections and request reconsideration.

Claim Rejections Under 35 U.S.C. 103(a)

Rejection of Claims 1-3 as being unpatentable over Sawa et al. in view of Sakai et al.

Based on the Applicants arguments presented in the response filed on January 18, 2008, the Examiner has withdrawn the anticipation rejection of the claims based on Sawa. However, the claims have been rejected as being obvious over the combined teachings of Sawa and Sakai.

As noted in the previous response, in the present invention (as embodied in the exemplary embodiment of Fig. 1), the PWM cycloconverter refers to the entire unit, while the PWM converter refers merely to item 7. The present invention requires that the PWM converter (as opposed to the entire PWM cycloconverter) be connected to a DC voltage means at one end and to a place before the input filter of the PWM cycloconverter at the other end. As can be seen in Fig. 1, the PWM converter (item 7) is connected to the DC voltage source (item 8) at one end and at a position between the current detector (item 10) and the 3-phase AC reactor (item 2).

PWM converter is connected at this point between current detector and the 3-phase AC reactor at one end and the DC source at the other end

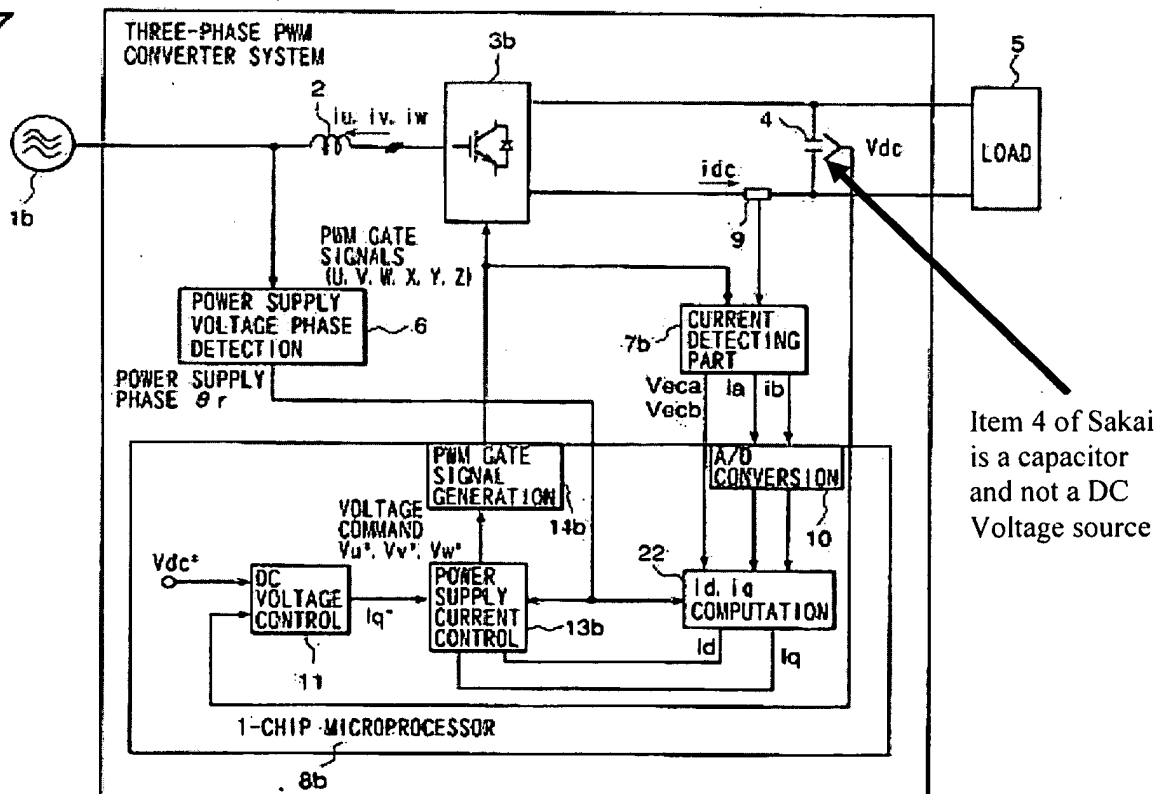
In the previous response, the Applicants argued that the claim requires the PWM converter to be connected to a DC voltage source and connected to a place before the input filter in the PWM cycloconverter. On the other hand in Sawa, **the output of the PWM cycloconverter as a whole is fed back to a position before the input filter.**

The present invention is quite different from Sawa in that the PWM converter (7 in Fig. 1) is included in parallel with the input portion of the PWM cycloconverter and in that an input current detecting means is included.

In the present Office Action, the Examiner admits that Sawa differs from the claimed invention because Sawa does not specifically disclose a PWM converter connected to a DC voltage source at one end and connected to a place before the input filter in the PWM cycloconverter. However, the Examiner alleges that the secondary reference Sakai overcomes this deficiency. Specifically, the Examiner refers to Fig. 7 of Sakai where the PWM converter system allegedly comprises a PWM converter that is connected to a DC voltage source 4.

The Examiner is believed to be mischaracterizing the teachings of Sakai. Fig. 7 of Sakai is reproduced below:

FIG. 7



Item 4 of Sakai is not a DC Voltage source as the Examiner is alleging. It is a smoothing capacitor (see col. 5, line 66 of Sakai). Further, item 3b of Sakai is not connected to a place before the input filter in the PWM cycloconverter as required by claim 1. V_{dc} of Sakai is not a voltage source either. The designation V_{dc} is shown near the capacitor 4 merely to denote that the voltage at that point is equal to the voltage V_{dc}^* which is shown towards the bottom left part of Fig. 7. At the other end, item 3b of Sakai is connected to the AC reactor 2.

Sakai does not overcome the admitted deficiencies in the teachings of Sawa. The Applicants respectfully submit that that a skilled artisan would not have been able to practice the present invention based on the combined teachings of Sawa and Sakai.

Further, Sakai merely relates to a method for controlling a PWM converter. The PWM converter (7 in Fig. 1) of the present invention corrects a distortion of a current of the PWM cycloconverter.

Therefore a skilled artisan would not have found it obvious to make the present invention from the combined teachings of Sawa and Sakai.

Moreover, the objects of the present invention are (1) to improve an input current waveform of a PWM cycloconverter and (2) to regenerate energy of snubber circuits (151 to 159 in Fig. 3) into commercial power source. On the contrary, the object of Sawa (USP No. 6,351,397) is to protect a PWM cycloconverter, while a surge voltage and an excessive current are prevented from appearing at the output side without a snubber circuit upon shutting off the PWM cycloconverter. Thus, the object of the present invention is quite different from that of Sawa. Further, Sakai (USP No. 6,556, 464) relates to a PWM converter for converting an AC voltage to a DC voltage. On the contrary, the present invention relates to PWM cycloconverter

for directly converting an AC voltage to a variable voltage having variable frequency. Thus, the object of the present invention is quite different from that of Sakai.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP 2142 citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner has not established *prima facie* obviousness of claim 1 based on the combined teachings of Sawa and Sakai at least because he has failed to satisfy the "all limitations" prong of the three prong test for obviousness. Since the "all limitations" test fails, the other two prongs of the test must also fail.

Claims 2 and 3 are dependent on claim 1 and are allowable for at least the same reasons.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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